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Key lessons learnt

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The four scenarios lead to differences in the size of the equine population: maybe twice as many horses as today, in the 'Everybody on Horseback' scenario, or half as much in the 'High-Society Horse' scenario. Businesses, facilities, as well as the types of employment would also be very different (cf. those in 'The civic horse' scenario). Likewise, the location of horses in the French regions or the categories of rural areas would differ to a great extent… They all raise shared concerns in terms of (i) the relationship between man and horse, (ii) economic efficiency, (iii) environmental issues, (iv) the preservation of breeds and pressure on surfaces and (v) health, welfare and caring for animals up to and beyond death. These questions call for research development in the fields of animal behaviour, economic and social sciences, breeding and genetic improvement. They also emphasize the need to enhance knowledge and innovation transfer.

Keywords: research, development, public policy

Specific and broad issues raised by the foresight study

Use, stakeholders, distribution, international role: highly divergent scenarios over the 20-year timeframe

The four scenarios represent highly divergent possible futures for the horse industry. Mention must be made, however, of the need when creating the scenarios to heighten and accentuate certain elements that may seem exaggerated in comparison with possible future changes.

Human-horse relationships. Most markedly disparate in the scenarios are differences in social dynamics and human–horse relationships. The people using or riding horses are not the same across the scenarios. The people involved in, or excluded from, equestrian activities vary, as do their views about horses. 'Everybody on Horseback' is centred on the middle class; both men and women of all ages become massively involved in recreational riding. However, the scenario must be viewed in perspective. The focus on market fundamentals by definition excludes those who cannot afford access. Across business practices for recreation and tourism, the horse is partly seen as a consumer good. In 'The High-Society Horse', riding attracts a growing number of male riders, although not to the exclusion of women. Horses are seen primarily as a luxury product. Inversely, 'The Civic Horse' sees emphasis placed on universal accessibility. Horses are used in various ways that encourage social contact and community building at a local level. Horses create social and territorial bonds. Equestrianism is increasingly community focused and is supported by public–private partnerships. In 'The Companion Horse', the relationship between humans and horses is emotive. This may accentuate the role of women in the world of horses. Equestrianism may be practiced more individually or as a family.

Horse population. The four scenarios give rise to very different horse populations in 20 years. The study did not aim nor try to quantify future population numbers, however. In 'Everybody on Horseback', the horse population increases substantially because of very strong growth in the recreational riding market. A doubling of current populations could be envisaged, partly as a result of growing demand for animals with specialised skills. Inversely, 'The High-Society Horse' sees horse populations drop roughly by half – the lowest of all the scenarios. With horses underactive or even inactive, a larger horse population seems unlikely in 'The Companion Horse'. Restrictions and regulations on horse breeding, exertion in competition, animal welfare and treatment would also be unlikely to give rise to larger populations. In this scenario, horse populations are stable, or may somewhat even fall, despite widespread interest by a large section of the population in being a part of a strong human–horse relationship. Protection and treatment for old horses lead to an ageing horse population. The situation is more positive in 'The Civic Horse'. Horse populations grow if government and community agencies and municipalities

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across France use horses for a variety of tasks, and if horses find renewed use in certain agricultural practices. Horse populations also increase if the private sector invests considerably in equine therapy and other related activities. However, growth may be more limited if, for example, municipalities find it difficult to finance these 'civic horses' in the long term.

Types of horse. The scenarios also offer differing views of the types of horse that will be popular and what kind of characteristics they will have, although all agree that horses with good temperaments will be essential. Specialised horses, including those for light recreation and hardy breeds produced at low cost, prevail in 'Everybody on Horseback'. At the other end of the spectrum are the multipurpose, sometimes heavier, horses used in more different ways in 'The Civic Horse'. Luxury sport horses in 'The High-Society Horse' are a world away from the horses in 'The Companion Horse'. 'The Companion Horse' sees pet horses – in general older and smaller than in all other scenarios and chosen on aesthetic or emotional criteria – living alongside hardy local breeds – preserved as a distinctive element of heritage – and sport horses – recognised for performance abilities over the long term. All scenarios aim for a better alignment of production to diverse user needs and a better early temperament analysis to more effectively orient horses towards their abilities and to reduce costs.

Businesses and infrastructure. Businesses and infrastructure in the horse industry also see substantial disparities. Between 'Everybody on Horseback' and 'The High-Society Horse' or 'The Horse Companion', the number of equestrian centres is very lopsided. The number of racetracks ranges from 20 to 200 in the different scenarios. No hypothesis was put forward as to the number of breeders in the future; however, given the wide ranges in horse populations, it seems probable that the number of breeders would range widely as well.

Employment. As a result, employment varies greatly among the scenarios. Employment is most stable in 'Everybody on Horseback' and 'The Civic Horse', although structured differently than at present. In 'Everybody on Horseback', most employment is freelance or salaried work at varied and numerous equestrian centres, riding schools and training facilities. There would also be an attendant increase in agricultural employment, provided it can be competitive. In 'The Civic Horse', there is a kaleidoscope of different opportunities filled by either multidisciplinary or highly specialised employees working in ancillary education, social, health and environmental services, although many posts will rely on public–private partnerships. Agricultural employment increases in this scenario as well. There are, of course, fewer employment opportunities in 'The High-Society Horse'. Employees are better trained and better paid, however, in this luxury service industry similar to the art market. Sport horse breeders are fewer in number but produce more high-quality horses. With a marked drop in the number of racetracks, and with equestrian centres more focused on providing service and advice to independent owners, 'The Companion Horse' clearly offers few opportunities for employment. Independent owners ride their horses at home and horses tend not to be very physically active. Employment is generally geared towards the service and counselling needs of independent owners. A strong demand for veterinary services is also foreseeable in this scenario.

Related and ancillary businesses will evolve, both in number and in function, in much the same ways as employment, across the four scenarios.

Location of horses and businesses. From one scenario to another, the location and distribution of horses in France differs palpably. There are differences both in terms of the types of space – rural, peri-urban and suburban – and the regions affected. 'Everybody on Horseback' will see its strongest growth in tourist areas. As report participants from Languedoc Roussillon underscored, tourist areas are attractive from a demographic point of view and also have easy, low-cost access to underused land such as former vineyards and scrubland. In Normandy, accessible horse pastures are also a feature. The complimentary pasturing of horses and ruminants together could be strengthened and further exploited. This is particularly true, given the structural pressure France's ruminant populations are currently experiencing and the need to preserve grassland areas. A reform of the Common Agricultural Policy (CAP) would be helpful in this respect. 'Everybody on Horseback' will face more difficulties in large, densely built up metropolitan areas because of real estate pressure, as participants from Île de France attested. There, mainstream equestrian activities have been pushed far from the centre. 'Everybody on Horseback' will also have limited impact in 'traditional' rural areas with low population densities far removed from large urban centres where a substantial part of its potential clientele actually lives. 'The Companion Horse', however, could spread just about everywhere other than the centre of the cities and their immediate suburbs. Horses are likely to have their widest distribution in this scenario. As soon as there is a bit of land for a horse or two, the desire to have a 'companion horse' can quickly become a reality. In this scenario, there is no strong need to be near equestrian centres, customers or infrastructure. Horse distribution is dotted fairly evenly across the map, although owners are disassociated from one another. The distribution of horses in 'The Civic Horse' depends on a number of factors. They include the importance attributed to horses, the actions of community associations and the private sector supporting a multipurpose role for horses, municipalities, their perception of possible benefits and their support to industry stakeholders through regional incentive schemes in favour of local public sector investment. The various avenues for horse use lead to divergent development possibilities in this scenario. Horses are generally distributed in a network across the most productive regions. Small- and medium-sized cities are most apt to grow the scenario to its fullest potential.

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'Everybody on Horseback' sees horses distributed mainly around regions with a strong and symbolic equestrian history and/or a social cachet, such as the Deauville region, famous stud farms in Normandy, Lubéron and the Var backcountry. New facilities built on very small scales may also develop in urban areas.

International issues. France's position on the international stage will certainly have an impact on the scenarios, although the impact is likely to differ from one scenario to the next. Although the scope of the report was limited to France, there is substantial benefit to be drawn from a better understanding of horse industry trends and outlooks in other countries in Europe and overseas. It is likely that 'Everybody on Horseback' and 'The High-Society Horse' would, in the coming years, be more exposed than other scenarios to, and more weakened by, the wide-scale adoption of innovations in animal genetics or breeding practices abroad that were poorly received in France.

Behind the diversity driving the different scenarios are a number of broad issues affecting them all, such as economics, organisational structure, social development, the environment and health.

Broad issues raised by the foresight study

Relationship between humans and horses. One of the primary issues, manifestly present across all scenarios in differing ways, is the relationship between humans and horses. Central to each scenario is the way the relationship is formed, maintained and 'exploited'.

Economic issues. With regard to economic issues, all scenarios addressed the question of the production cost for horses and for equestrian activities and the pricing of equestrian services. For example, studies undertaken by the REFERences network clearly underscored the major role food costs play in reducing overheads. Overhead costs and profitability are an essential factor for people who want to invest in the horse breeding industry in France. Efficiency is generally measured in comparison with other countries. This is an important issue for 'Everybody on Horseback' where new equestrian activities attract a growing number of riders but where restrictions could also be placed on low-cost horse imports from neighbouring countries such as Spain, Belgium, Germany or the Netherlands, or on imports from further afield, from Eastern Europe, the United States of America or South America. Economic concerns of a different nature come into play in 'The High-Society Horse'. Here, clients are moneyed, but to attract them it will be necessary to make targeted, effective and profitable non-material investments in marketing, image building and brand differentiation. Horse production and maintenance costs will also be considerable in 'The Civic Horse'. Costs will affect the ability of municipalities and other institutions to finance horse-related projects in the long run. 'The Companion Horse' must deal with a more specific economic issue: the question of care costs for old horses and, in particular, their disposal after death.

Organisation. An important issue with regard to organisational structure is managing institutional change for business and for facilities. There is growth, decline and transformation across all scenarios. How to manage a shift from 200 racetracks to 20, or how to orient them towards other activities? How to regulate increased competition among equestrian centres operating in an open recreation market? How to support the many equestrian centres and stables that will go out of business in 'The High-Society Horse', or whether not to support them at all? How best to organise and ensure the longevity of public–private partnerships in 'The Civic Horse'? How to help related and ancillary businesses adapt to one scenario or another?

Social development. In terms of social development, the role of employment is crucial. Difficult working conditions, high turnover of employees – who leave as disillusioned with horse related careers as they were passionate in the beginning – lack of job security for most low paying jobs, poor career development prospects and an increasingly female workforce in some sectors – one employee out of two, or more for riding professions – are all characteristic of the horse industry. All scenarios approach work and employment in different ways. 'Everybody on Horseback' creates substantial employment opportunities, but there is a risk that job security will worsen and unreported employment will increase because of strong competition among businesses to reduce their costs. 'The High-Society Horse' will lead to drastic reductions in horse-related employment. Those still working in the industry will need new qualifications or training to meet the needs of a demanding clientele. 'The Civic Horse' scenario involves employment in new, nascent industries for which training courses, professional qualifications and experienced employees do not readily exist.

Addressing these broad issues serves to highlight the need to develop social science research on the horse industry and its stakeholders, as outlined below.

Environmental issues. Environmental issues also cut across all scenarios. On the whole, in each scenario, the horse industry's impact on the environment tends not to be negative. It has a number of benefits, including its advantage over other herbivore species in terms of greenhouse gas emissions, its role in maintaining, protecting and using grassland areas, and its contribution to enhancing landscapes. However, the reduction of biodiversity and the loss of genetic heritage were recurrent themes. 'Everybody on Horseback' is market driven and responsive to demands that may not give consideration to long-term consequences. Non-market concerns might not be considered, and hence the possible disappearance of certain breeds. The situation may be similar in 'The High-Society Horse', where there is no particular emphasis placed on preserving draught horse breeds or particular breeds of riding horse and pony. Concern for biodiversity and preservation of breeds is more present in the other two scenarios, especially in 'The Civic Horse' where collective, long-term challenges can be addressed.

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Issues such as sustainable development, shared cultural identity, and preserving and transmitting heritage are certainly more at the forefront.

Health and animal welfare issues. Varying by degrees of intensity among scenarios, there is a strong general trend in health and animal welfare issues towards greater demands for medical care, health monitoring, natural horsemanship and horse welfare. The health hazard existing across all scenarios, regardless of population numbers, concerns new emerging diseases such as African horse sickness and the West Nile virus. Incidence of these diseases is independent of changes in animal transport because they are insect borne. Another issue varying by degrees among the scenarios is the existence of veterinary facilities able to offer quality treatment throughout the country and not just in areas with a long equestrian history. A trend common to all scenarios is the marked reduction of the horsemeat industry, which is even prohibited in certain scenarios. There are implications as to the management of end of life and the disposal of remains. The United States of America, having banned horse abattoirs, found that cases of abandonment and neglect became common with horses often shipped off to neighbouring countries for export. Having learned from the ban's negative outcomes, the United States Congress recently reauthorised the regulated slaughter of horses. However, the debate is ongoing, with new calls for a ban following recent revelations in Europe of undeclared horsemeat in beef products. Health issues will be most sharply felt in 'The Companion Horse' because, for example, horses will be more widely distributed and the horsemeat industry will be prohibited. The increased number of amateur, but passionate, owners could indirectly, and unintentionally, lead to neglectful abuse owing to a loss of specialised knowledge in horse nutrition, daily care, shoeing and so on. For this reason, 'The Companion Horse' and 'The Civic Horse' call for horse breeding and ownership permits that are granted following an awareness raising and training course.

The issue of doping is present across all scenarios, but is most serious in 'The High-Society Horse' and 'Everybody on Horseback'. It is less pressing in 'The Companion Horse' because of the drastic strengthening of regulations protecting animals and because horses are used for sport in less exploitative ways.

Horse temperament analysis. Most scenarios underlined the importance of early temperament analysis to better differentiate supply and to better respond to demand. This common need encourages new discoveries in genomics and phenotyping, as outlined in the following section.

Future outlook for public policy, research and development

Outlook for public policy

Whether from European Union (EU), State or local levels, the presence, or dearth, of public policy affects all scenarios and increases or reduces the position accorded to industry self-governance.

The highly competitive market in 'Everybody on Horseback' necessitates cost cutting. This creates strong pressure on employment and tax revenues, and has ramifications for training, innovation, technical assistance and racing regulation. There are also risks to genetic heritage, both because of a heavy reliance on imports initially and because the choice of a type or 'brand' rather than a breed of horse comes to dominate, leading to crosses that produce user-friendly horses but do not support breed preservation.

'The High-Society Horse' assumes a continued economic malaise and shifts the horse industry to the luxury market. Here too there is a risk to genetic heritage. A limited number of highly specialised breed farms concentrate their production on the most cost-effective horses, whereas draught horses and draught horse breeds have nearly disappeared.

There are social, environmental and territorial implications to 'The Civic Horse', including the introduction of a breeding licence and a State monopoly on betting to meet concerns about gambling addiction. There is support for community-based initiatives and concern for sustainable development.

Health care is a central feature of 'The Companion Horse'. Ownership permits are required.

Public policy in the EU. The EU plays a role in the horse industry mainly through its CAP and its regulatory framework.

- The CAP is of considerable importance to the horse industry and to this study. CAP priorities for 2014 to 2020 include protecting the environment, developing rural areas and strengthening the competitiveness, sustainability and preservation of agriculture across Europe to guarantee a safe, high-quality food supply.
- Until now, the production and use of equines has been little present in the CAP and merits being better integrated therein. EU policy in favour of the horse industry would largely fall under the second pillar promoting innovation, territorial balance, the environment and sustainable development. Through balanced rural development, and given the need for an increased number of horses, incorporating equines into the CAP would be of most benefit to 'Everybody on Horseback' and 'The Civic Horse'. These scenarios are more closely aligned to current rural development priorities, such as supporting rural employment, diversifying farm holdings, biodiversity, and animal health and welfare. The second pillar under the future framework is also likely to take advantage of diverse, innovative production systems (outdoor pasturage year round with forage for 8 to 12 months, rotational or season long grazing in conjunction with other herbivores, etc.), particularly to improve the use of grasslands in grazing areas and, notably, of difficult terrain such as marshes, drylands and highlands where horses make best use of available resources.
- EU regulatory frameworks:
  EU regulations have a broad policy impact and may strongly affect scenario outcomes

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- Will tax rates, and more specifically the value-added tax (VAT), move upwards and be harmonised, with negative knock on effects to investment capacities, further reduced job security and a drop in the number of businesses? If this is the case, it may yet be possible to maintain a reduced VAT rate for activities considered agricultural in nature such as breeding, 'the preparation and training of domesticated equines for use other than in the performing arts' (Law No. 2005 157 of 23 February 2005 on rural development), and services related to the right to use horses in physical sport activities (Law No. 2011 1977 of 28 December 2011 for the 2012 Budget, paragraph 14, Annex III to Council Directive 2006/112/EC of 28 November 2006 on the common system of VAT). It is particularly important that the French and European horse industries are involved in the European Commission's public debate on the future of the VAT.
- EU regulation touches everything, from transport, identification and traceability, breed registry management, animal welfare, funding, competition and consumer protection, particularly with regard to trade in animals. If regulations become more liberal or more protectionist, impacts will be more or less strongly felt across all scenarios, especially in 'Everybody on Horseback' and 'The Civic Horse'.
- Lobbying plays a significant role in addition to policy positions taken by the French Government. Increased interaction at a European level of industry professionals and stakeholders and a possible representation of the horse industry to the European Parliament could both be influential.
- Given the extent of debate on an international level on sustainable development issues (United Nations Conference on Sustainable Development Rio+20), regulation in favour of a greener and fairer economy stands to become increasingly widespread. The horse industry is likely to benefit from regulation that limits greenhouse gas emissions, supports energy saving and animal traction, promotes biodiversity and so on. Certainly 'The Civic Horse' and, to a lesser extent, 'Everybody on Horseback' stand the most to gain from these changes.

Public policy in France. The French Government has played an important role in the horse industry in the recent past; the risk, however, is that its influence will diminish or its focus will shift. The government is primarily involved in two ways. It facilitates economic development, especially in 'Everybody on Horseback' and 'The Civic Horse', and it adopts and enforces regulation, particularly on a national level, although the EU is now increasingly driving regulation.

Depending on the scenario, the Government may take action in the following areas:

- gambling policy and horseracing regulation ('Everybody on Horseback', 'The High-Society Horse', 'The Civic Horse');
- breeding permits and ownership permits ('The Civic Horse', 'The Companion Horse');
- encouraging professional training to increase industry competitiveness in France ('Everybody on Horseback', 'The High-Society Horse') or to strengthen job security and stimulate interest therein ('Everybody on Horseback', 'The High-Society Horse', 'The Civic Horse');
- encouraging innovation, research and development ('Everybody on Horseback', 'The High-Society Horse');
- traceability and the management of identity databases;
- certification and reinforced supervision for old horse care facilities, animal funeral services and crematoriums as alternatives to knackeries ('The Companion Horse').

Government policies in health monitoring are not subject to EU directives and the State will continue to carry out work in this area in collaboration with veterinarians, health-care providers and specialists.

The key issue in 'The Civic Horse' is a renewed focus on public policy areas where horses play a valuable role, such as social inclusion, education, culture and the environment. Effective education and awareness raising strategies will be necessary to support such a shift. In this scenario, the twenty-first-century society is deeply passionate about restoring the relationship between humans and horses.

Government involvement will be less based on direct intervention and more focused on creating incentives and incorporating the horse industry into its policy decisions.

The State could also draw on the expertise of a public sector stakeholder to ensure knowledge transfer, provide technical and economic support, and promote growth. Such an agent would be able to develop partnerships among professional organisations, municipalities and with the private sector through its facilities across France.

Public policy at local and regional level. Decentralisation policies have, for a number of years now, shifted powers, jurisdiction and response measures onto local and regional governments in an effort to increase efficiency and be closer to communities. EU action in favour of regions, supported by the Structural Funds, also acknowledges these decentralisation policies. The ongoing influence of these two factors may lead to specific policies favouring the horse industry through the creation and implementation of regional development plans. Such policies may include contractual agreements between national and local governments through, for example, the State–Region Project Contract. Municipalities are responsible for a number of fields connected to the horse industry, including economic development, land-use management, professional development and heritage preservation to protect endangered breeds. Also of interest to the horse industry are social services, social assistance, culture and tourism, which fall under the remit of regional governments.

In general, local authorities are not able to implement action directly, but are required instead to form agreements with community-based agencies or other organisations to deliver services. The agencies and organisations have a key role in

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driving regional and local projects. The relation between local authorities and contracted agencies is not always smooth, however. There may be too many local authority departments or too many contracted agencies involved in each project. Local authorities may face budgetary constraints limiting the ability to continue activities and creating difficulties for community agencies because of reduced funding.

Municipal and regional policy is most important to 'The Civic Horse' and 'Everybody on Horseback'. Using contracted services, these policies can efficiently respond and adapt to local conditions and concerns.

It is important that the horse industry continues to organise regionally. A united and dynamic regional organisation would considerably facilitate cooperation among stakeholders.

New governance needed

In a well-organised industry, governance and guidance are carried out by stable, credible organisations with adequate financial means that ensure industry growth and performance.

Projections for 2030 highlight the need, across all scenarios, to fundamentally reassess the organisation and financing of both the supply and the demand sides of the industry. Socio-occupational organisations are all financially fragile and at times fragmented and not always credible. The situation must change. Even without further research on the subject, the need to reflect critically on industry leadership and financing structures is clear. They will become largely private sector concerns in 'Everybody on Horseback' and 'The High-Society Horse', and a matter for the public sector in 'The Civic Horse' and 'The Companion Horse'. Horse industry stakeholders will have to increase their participation in agricultural industry economic and decision-making structures. The industry's position within the CAP, its access to land, support to stakeholders, and access to technical support and training will vary, depending on the scenario.

For the horse industry to grow, to be economically sustainable and to effectively meet society's needs – especially in 'Everybody on Horseback' and 'The Civic Horse' – it must become more professionally oriented, with greater cohesion among stakeholders, more accessible to the public and more open to the world. Public policy, whether from the EU, the national government, regions or municipalities, would thus undoubtedly become more efficient.

Outlook for research and development

Broadly speaking, research advances and new techniques can improve breeding practices and reduce costs through measures such as phenotyping and genetic engineering. Substantial knowledge, methods and tools for innovation were acquired by public research institutions. Since 1970, these received 90% of their real financing costs from the French Government. Knowledge transfer to end users remains insufficient; however, despite the creation of a specialised equine technician development network for horse industry stakeholders similar to networks that exist for other species. Under 'Everybody on Horseback' and 'The Civic Horse', publicly financed research remains essential. In 'The High-Society Horse' and 'The Companion Horse', private sector investment also increases for reasons specific to those scenarios, such as support from the pharmaceutical industry or event sponsorship.

The French horse industry must deal with the ongoing problem afflicting the balance between supply and demand. The observation is not new, but was raised on numerous occasions by study participants who said that the types of horse produced in France and the characteristics they are bred for do not match the needs of horse users.

Taken together with the foresight study that led to this report, these elements call for research in the following areas and bring to light some priorities that will be addressed in the conclusion.

Animal behaviour. The first field of cross-cutting research is in animal behaviour and in subjects related to the relationship between humans and horses. In all four scenarios, research in temperament analysis is called for. Research would help to select calm horses well suited to the most common users in 'Everybody on Horseback', beginners in equestrian centres or trail riders. In 'The High-Society Horse', it could preclude raising horses with unsuitable temperaments that would not be commercially viable. Research in temperament analysis could single out skittish or aggressive animals that would be in contact with people who had little or no experience with horses in 'The Civic Horse'. It could also reduce accidents in the numerous households keeping a horse in 'The Companion Horse'. Research can and should also look at developing animal welfare indicators and determining the conditions favourable thereto. 'The Civic Horse' and 'The Companion Horse' both require a deeper understanding of the relationship between humans and horses and of natural horse behaviour to address the call for a natural harmony between humans and animals.

Economics, managment and sociology. There is also an urgent need to better understand industry stakeholders. In the early 2000s, the Haras nationaux prepared a report for its Scientific and Technical Orientation Board (COST) underscoring the fact that research, be it direct or indirect, on horses was almost entirely devoted to the animals themselves and their reproduction, genetics, nutrition, health, pathologies and locomotion to improve their performance. Research either ignored or dealt only summarily with humans and the ways they use horses, or with the businesses in which equestrian activities occur. Since then, there has been change, but it remains very limited and incomplete. The issues raised by the foresight study stress the pressing need for better understanding within the industry of technology, economics, social issues, riding centre operations, and industry stakeholders and users. Demand-side research on sociology and strategic marketing is needed to understand the industry's diverse clientele and its image, use and expectations of, and relationship with, horses. Broad, university-level research on economics, management and sociology is needed together with highly specialised research and development, similar to work conducted by

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the French Livestock breeders' Institute on breeding systems and key indicators. Such research can inform future decisions on the organisation of work in equestrian facilities, and on production and training costs and derived sales prices for horse enthusiasts. Research and development professionals must ensure that industry stakeholders can contribute to innovation and to developing new practices. This will make them more competitive and better able to respond to demand. As an example, an interdisciplinary research programme looking at optimising the way horses are kept could investigate systems as a whole and model them, with an aim to bring together economic performance, environmental impact, and safety and welfare for both the horse and its rider or caretaker to create a new, more functional and more conscientious kind of stable.

Genetic engineering research. Taking the needs of municipal, therapeutic and recreational horse users into account, as seen in 'Everybody on Horseback' and 'The Civic Horse', will require changes to equine genetic engineering research. There is already clear interest in modern genetics tools for improving competitive sport performance; however, attention should also be given to producing horses that better meet user needs for recreational horses, 'civic horses' and companion horses. Genetic selection and innovative tools should focus more on the production of horses that are easier to use and to train and better suited to a wide range of people. Genomics should consequently be a major area of research. In each scenario, the selection of genetically appropriate, and often much specialised genetic types is what drives modernisation and leads to production increases or reductions. Used with other more classic tools, genetic engineering requires more clearly understood selection goals, innovations in tools and methods, increased unity across the industry and a more comprehensive adoption of new technologies. Horses cannot remain removed from innovation, genomic innovation included. The French horse industry can yet regain its European – or even worldwide – leadership position by encouraging specific improvements to animal genetic value and an early analysis of foal ability to optimise and guide their development. This is true across all segments, including the horseracing industry. Recent moves, imposed by the EU, towards strictly privatised stud farms and liberalised reproduction rights are gradually reducing the notion of a common male DNA. To maintain genetic progress, breeders must be able to share trustworthy and impartial information on the quality of breed animals. Genomic study can also lead to the development of biomarkers that indicate pathologies or responses to training, or that can even be used in the fight against doping. It is also essential to guarantee confidence in and quality of competitions and the validity and trustworthiness of their results. The importance of wide scale, early phenotyping should also be underscored and will require criteria to be defined, tools developed and objectives validated.

Horse rearing practices. Another research focus is horse rearing practices. Research herein would reduce costs, increase animal welfare and promote sustainable development. Such research could evaluate horse ability to make the best use of the least costly feed, forage and dried fodder to meet its nutritional needs over successive cycles of breeding and use. It should also lead to programmes to assess the environmental impact of horses by use, management and location. Programmes could draw on the different trends operating in the various scenarios to determine their criteria. Equestrian and agricultural businesses as well as riders and owners could all use technical and economic guidelines to apply the study findings. For this to happen, there must be a transfer of knowledge on horse rearing practices and pastureland management and a genetic management system for breeds adapted to different environments, in particular for hardy breeds and other breeds with small populations.

Ecosystem services. A CAP more supportive of environment friendly agriculture and increased assistance for rural development could foster research on the ecosystem services provided by horses, particularly in maintaining and preserving grasslands. Horses are able to adjust their eating habits based on variations in the availability and quality of ground vegetation. Horses can be used to efficiently open new territories through their ability to make use of low-quality ground cover. However, their foraging behaviour limits the productivity of grasslands by grazing grass too short and avoiding certain grasses. Equines have a number of complementary advantages over other ruminants for preserving or increasing grassland biodiversity. There is substantial room for growth in this area and in the use of forage, in particular. Innovative strategies involving animal management and grassland use need to be developed (Martin-Rosset, 2012). Experimental studies on less-intensive farming systems could investigate the use of horses to preserve grassland areas that are no longer used by other herbivores. Study findings could encourage economies of scale with less impact on the environment, while curbing the risk of businesses leaving France. This may be one of the benefits of 'Everybody on Horseback', with its efforts to reduce costs and adapt production to respond to market needs.

Animal health. The scenarios also called for research on animal health.

There are higher health risks in 'Everybody on Horseback' because of the larger horse population. Increases to the number of horses on a limited amount of land will engender specific research questioning animal welfare, training and waste management. 'The High-Society Horse' will require sophisticated personalised medical care because the remaining few horses are worth substantial sums of money and are expected to perform at high levels. 'The Civic Horse' requires animals in perfect health to perform their social duties. Under 'The Companion Horse', there is a need for enhanced care of old horses nearing the end of their lives. Health, welfare and performance are interconnected and are of concern across all scenarios. Animal health research needs

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differ by scenarios, however. In 'Everybody on Horseback', research on health and user safety is most needed, focusing on, for example, safety equipment such as helmets and safety vests and developing teaching methods that ensure rider safety. Epidemiological surveillance studies and preventative protocols are necessary, given the growing number of exchanges within Europe and overseas and the heightened risk, caused by global warming and insect-borne diseases. In 'The High-Society Horse', emphasis is placed on research leading to improved performance through, for example, athlete health and performance monitoring and health safeguarding. There may also be an increased use of pharmacological products. In 'The Companion Horse' in particular, but in all other scenarios as well, horse ageing, the ability to 'retire' and end of life management are major concerns. Wanting to keep a horse alive at any price may lead to significant suffering for the animal.

There are a number of cross-cutting issues in animal health research as well. There is concern about the availability of drugs suitable for horse use. Regulatory approval for new drugs is costly and time-consuming for manufacturers and the horse market is considered too small. Drug resistance is also a worry for horses, as it is for other species. It will require research on new treatments that are effective. It would also be preferable to implement strategies and techniques limiting the need for drug treatment and thus reducing the incidence of drug resistance.

Conclusion. In conclusion, the study was conducted by focus on some current public sector research; however, it felt that knowledge was insufficiently transferred or not always suitable. The study also underlines the need to change research priorities. Research on the fields of economics, sociology and the environment should increase and research on animal behaviour is indispensable.

Reference

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